

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

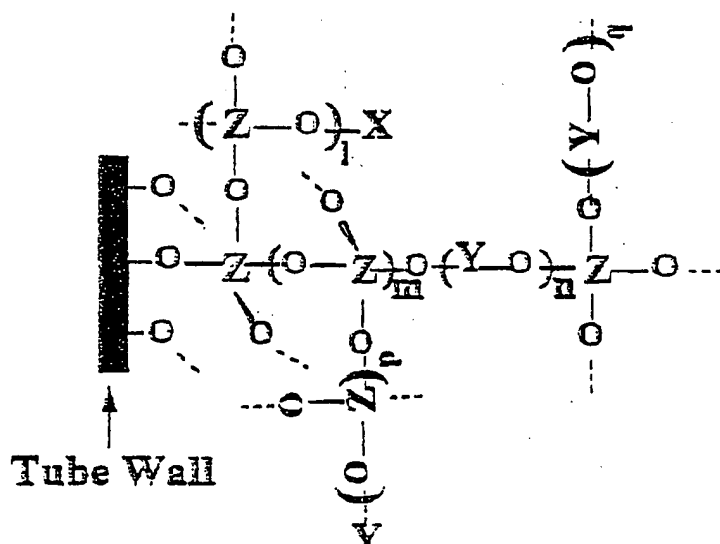
1. (Currently Amended): A capillary column comprising:

a. a silanol group-containing tube structure that has been subjected to a hydrothermal treatment, and

b. a deactivated surface-bonded sol-gel coating on a portion of the tube structure to form a stationary phase coating on that portion of the tube structure,

said deactivated stationary-phase sol-gel coating enabling separation of analytes while minimizing adsorption of analytes on the sol-gel coated tube structure.

2. (Original): A capillary column as set forth in claim 1, wherein said deactivated surface-bonded sol-gel-coating on the portion of the tube structure has the formula:



wherein,

X = Residual of a deactivation reagent;

Y = Sol-gel reaction residual of a sol-gel-active organic molecule;

Z = Sol-gel precursor-forming element;

I = An integer ≥ 0 ;

m = An integer ≥ 0 ;

n = An integer ≥ 0 ;

p = An integer ≥ 0 ;

q = An integer ≥ 0 ;

and

l, m, n, p, and q are not simultaneously zero.

Dotted lines indicate the continuation of the chemical structure with X, Y, Z, or

Hydrogen (H) in space.

3. (Currently Amended): A capillary column as in claim 2 wherein the residual of the deactivation reagent is selected from the group consisting of ~~including~~ polymethylhydrosiloxane and hexamethyldisilazane.

4. (Currently Amended): A capillary column as in claim 2 wherein said sol-gel reaction residual is selected from the group consisting of ~~including~~ molecules ~~with~~ having hydroxysilane ~~or functional groups, molecules having~~ alkoxy silane functional groups, molecules having [[or a

combination thereof]] at least one hydroxysilane group and at least one alkoxysilane group;
[[either polymers or monomers, such as]] polydimethylsiloxane (PDMS),
polymethylphenylsiloxane (PMPS), polydimethyldiphenylsiloxane (PDMDPS), polyethylene
glycol (PEG) [[and related polymers like Carbowax 20M]], polyalkylene glycol [[such as
Ucon]]; [[macrocyclic molecules like]] cyclodextrins, crown ethers; , calixarenes, and alkyl
moieties [[like octadecyl, and octyl]].

5. (Currently Amended): A capillary column as in claim 2 wherein said sol-gel precursor
forming element is selected from the group consisting of ~~including~~ Si, Al, Ti, and Zr.

6. (Currently Amended): A method of preparing a capillary column comprising the
steps of:

- a. providing a [[s]] tube structure having silanol groups;
- b. hydrothermally treating the tube structure;
- [[b]]c. providing a sol-gel solution comprising:
 - i. a sol-gel precursor,
 - ii. an organic material with at least one sol-gel active
functional group,
 - iii. a sol-gel catalyst,
 - iv. a deactivation reagent, and
 - v. a solvent system;

[[c]]d. reacting at least a portion of the tube structure with the sol-gel solution under controlled conditions to produce as a surface-bonded sol-gel coating on the portion of the tube structure;

[[d]]e. expelling the sol-gel solution from the portion of the tube structure; and

[[e]]f heating the coated portion of the tube structure under controlled conditions to ~~cause the deactivation reagent to react with the surface-bonded sol-gel coating to deactivate and~~ to condition the sol-gel coated portion of the tube structure.

3/ 7. (Cancelled)

8. (Original): A method as set forth in claim 6 7, wherein the step of providing the tube structure comprises providing a tube structure with an inner wall, reacting the sol-gel solution with the inner wall of the tube structure for a period less than 1 hour to form a surface-bonded sol-gel coating on the inner wall of the tube structure, and then applying gas pressure to the sol-gel solution in the tube structure to expel the sol-gel solution from the tube structure.

9. (Currently Amended): A method as set forth in claim 8, wherein the sol-gel precursor comprises an alkoxy compound, the organic material comprises monomeric or polymeric material with at least one sol-gel active functional group, the sol-gel catalyst is ~~taken~~ selected from [[a]] the group consisting of an acid, a base and a fluoride compound, and the deactivation reagent comprises a material reactive to hydroxyl groups bonded to the sol-gel-precursor forming element or to the tube wall surface.

10. (Currently Amended): A method of preparing a capillary column that includes the steps of:

- a. providing a capillary column comprising a silanol group-containing tube structure that has been subjected to a hydrothermal treatment; and
 - b. [[by]] simultaneously ~~deactivating~~, creating, coating, [[and]] immobilizing and deactivating a stationary phase on the [[a]] tube structure.
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11. (Currently Amended): A method as set forth in claim 10, wherein the immobilizing of the further defined as chemically bonding stationary phase molecules to an interfacial organic-inorganic polymer layer, the polymer layer evolving over a surface of the tube structure comprises forming a chemical bond between the stationary phase and the silanol groups.

12. (New) The capillary column of claim 4, wherein the alkyl moiety comprises octadecyl moiety.

13. (New) The capillary column of claim 4, wherein the alkyl moiety comprises an octyl moiety.

14. (New) The capillary column of claim 1, wherein the stationary phase coating comprises a sol-gel polymer layer having organic and inorganic molecules.

15. (New) The capillary column of claim 1, wherein the silanol group is derivatized.

16. (New) The method of claim 10, wherein the step of creating a stationary phase comprises chemically reacting sol-gel-active components of a sol solution.

17. (New) The method of claim 10, wherein the tube structure is contacted with the stationary phase, and the stationary phase comprises an organic and inorganic interfacial polymer layer.

18. (New) The method of claim 10, wherein the stationary phase comprises a sol-gel polymer layer having organic and inorganic molecules.

31 19. (New) The method of claim 10, wherein the step of deactivating the stationary phase comprises reacting the silanol group with sol-gel active components of a sol solution at substantially the same time as creating the stationary phase coating.

20. (New) The method of claim 10, wherein deactivating the stationary phase comprises reacting the silanol groups while the tube structure is subjected to heat treatment.
